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**Notice of Allowability**

Application No.

10/539,997

Examiner

Ida M. Soward

Applicant(s)

FORSTER ET AL.

Art Unit

2822

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Applicants' amendment filed June 20, 2007.
2. ☒ The allowed claim(s) is/are 1-9, 11 and 12.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

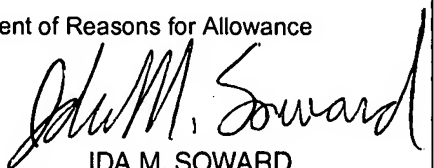
4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
IDA M. SOWARD  
PRIMARY EXAMINER

## DETAILED ACTION

This Office Action is in response to the Applicants' amendment filed June 20, 2007.

## EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Andrew Wilford on August 28, 2007.

The application has been amended as follows:

Claim 1. (currently amended) A layer sequence or structure comprising:

a first highly doped  $n_d$ -GaAs layer;

a graded layer of AlGaAs on the first highly doped layer and having an aluminum concentration that diminishes, starting from a boundary surface with the first highly doped layer, in the direction of an opposite boundary surface of the AlGaAs layer;

a second highly doped  $n^+$ -layer; and

~~on at least one boundary layer of the AlGaAs layer~~ an undoped intermediate layer juxtaposed with the ~~respective~~ the first or second highly doped layer and at least one boundary layer of the graded AlGaAs layer.

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Claim 9. (currently amended) A method of making a layer sequence or structure, the method comprising the steps of:

providing a first highly doped  $n_d$ -GaAs layer as a substrate having a pair of opposite boundary surfaces,

forming on one of the boundary surfaces of the first highly doped GaAs layer an undoped GaAs layer and epitaxiing the ~~underdoped~~ undoped GaAs layer at an appropriate temperature,

providing on the undoped GaAs layer a graded AlGaAs layer; and

providing on the other of the boundary surfaces a second undoped GaAs layer and epitaxiing the second undoped GaAs layer at an appropriate temperature.

Claim 12. (currently amended) A layer sequence or structure comprising a first highly doped layer,

a graded layer arranged on the first highly doped layer,

a second highly doped layer, and

~~on at least one boundary surface of the graded layer~~ an undoped intermediate layer juxtaposed ~~[[with]]~~ between one of the highly doped layers and a boundary surface of the graded layer.

***Allowable Subject Matter***

Claims 1-9 and 11-12 are allowed.

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The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose, make obvious, or otherwise suggest the structure of the applicant's together with the other limitations of the independent claims, such as:

In claim 1, "a graded layer of AlGaAs on the first highly doped layer and having an aluminum concentration that diminishes, starting from a boundary surface with the first highly doped layer, in the direction of an opposite boundary surface of the AlGaAs layer; an undoped intermediate layer juxtaposed with the first or second highly doped layer and at least one boundary layer of the graded AlGaAs layer";

In claim 9, "forming on one of the boundary surfaces of the first highly doped GaAs layer an undoped GaAs layer and epitaxiing the undoped GaAs layer at an appropriate temperature, providing on the undoped GaAs layer a graded AlGaAs layer; and providing on the other of the boundary surfaces a second undoped GaAs layer and epitaxiing the second undoped GaAs layer at an appropriate temperature; and

In claim 12, "an undoped intermediate layer juxtaposed between one of the highly doped layers and a boundary surface of the graded layer".

The dependent claims being further limiting and definite are also allowable.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to layer sequence semiconductor device structures:

Augusto (US 6,207,977 B1)

Koscica et al. (5,323,030)

Twynam (6,111,265)

Tyagi (US 6,249,025B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M. Soward whose telephone number is 571-272-1845. The examiner can normally be reached on Monday - Thursday 6:30am to 5:00pm.

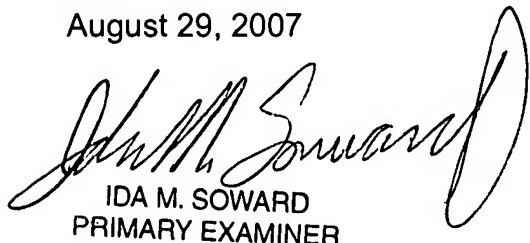
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra V. Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IMS

August 29, 2007

A handwritten signature in black ink, appearing to read "Ida M. Soward", with a large, stylized loop at the end.

IDA M. SOWARD  
PRIMARY EXAMINER